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Introduction

Trauma is the most common non-obstetric cause of death, with motor vehicle accidents and inter-partner violence accounting for most cases.¹⁻³ The unique case of having “two patients” may shift associated complications, evaluation, and management. In a pregnant patient, compression of the abdomen during injury is typically what differentiates major blunt trauma from minor.⁴ In this review, we will focus on blunt trauma and how to approach these patients.

Presentation and Initial Evaluation

Upon arrival, the standardized blunt trauma algorithm should be followed, with medical priorities paralleling management of a nonpregnant patient. The best fetal resuscitation is focusing on maternal resuscitation. Evaluation begins with assessment of the “ABCs”: airway, breathing, and circulation. It is crucial to maintain adequate blood pressure and oxygenation as two patients are at risk of hemodynamic compromise. Do not hesitate to address these concerns if they are clear on presentation.

Additional measures should be taken to determine the level of uterine height in an effort to estimate gestational age. In a normal anatomic pregnancy, the uterus begins to rise above the pelvis and is palpable in the abdominal cavity at around 8 to 12 weeks gestation. It will approach the level of the umbilicus around week 20, and thereafter grow approximately 1 cm per week until about 40 weeks gestation. In the case of a stable patient, this estimate may be corroborated with a measurement of fundal height or ultrasound.⁵ Any significant discrepancy between uterine height (or measured fundal height/ultrasound findings) and a previously known gestational age should raise concern for uterine trauma.

There are several findings that are concerning for a more serious mechanism of injury to the uterus and fetus: vaginal bleeding, ruptured membranes, bulging perineum, presence of contractions, or abnormal fetal heart rate.

During your evaluation, it is also important to keep in mind that notable normal physiologic changes of pregnancy may bias emergency interventions. In pregnancy:

- Lower cardiac output due to compression of the inferior vena cava by the gravid uterus; more pronounced as the patient approaches term, and when in the supine position.⁶⁻⁸
- Greater risk of aspiration and difficult intubation due to a transient decrease in lower esophageal sphincter tone as the pregnancy progresses, coupled with increased generalized edema (including airway edema).⁹⁻¹¹
- EKG findings in pregnant patients may display a mild left axis deviation and/or benign transient ST/T wave changes.¹²⁻¹³
- Some lab findings which are otherwise abnormal become normal, including decreased serum creatinine, mild leukocytosis, increased fibrinogen, and mild thrombocytopenia.¹⁴⁻¹⁶

Management

After consulting the obstetrics team and evaluating the “ABCs”, the most immediate concern in these patients is assessing the necessity of an emergency cesarean section. For an unstable expectant mother refractory to stabilizing interventions, a c-section may be indicated to relieve uterine compression of maternal vasculature and restore maternal hemodynamics. This is very rare, and hopefully you never have to do this in your career.

Much more commonly, here are the top two things you need to take care of when dealing with a pregnant patient in blunt trauma: determining RhD status and fetal monitoring.

1. Assess maternal RhD status. Fetomaternal bleeding is relatively common in pregnant trauma patients, with complications including maternal alloimmunization, fetal anemia, or fetal death.^{6,17} Following initial stabilization, RhD negative mothers should undergo further testing to determine dosing of prophylactic anti-D-immunoglobulin (Rhogam) to prevent complications of alloimmunization.
2. Assessing fetal stability is crucial, and fetal monitoring should begin as soon as maternal vitals allow it. Fetal complications can occur even in cases with no significant maternal injury, and an abnormal fetal heart rate is often the first sign of concern for potential fetal instability. Fetal and uterine monitoring can be discontinued after 4 hours in cases where there are no fetal

heart rate abnormalities, uterine contractions/bleeding, or uterine tenderness.¹⁷ An otherwise concerning presentation warrants leaving the patient under monitoring and coordination of care with an obstetrician.

When undergoing further evaluation with imaging modalities, risks of radiation should be considered. Ultimately, however, the information obtained to adequately treat these patients typically outweighs the radiation risk to the fetus.¹⁹ Ultrasound is often the preferred imaging modality due to its safety profile. As in acute trauma management of any patient, ultrasound can detect free intraperitoneal blood after blunt trauma during the FAST exam and should be used as such in pregnant cases as well. A Focused Assessment with Sonography for Obstetrics (FASO) is a modified FAST exam for pregnant patients that limits visualized areas to intraperitoneal sites that is sometimes employed in these cases.²⁰ Additionally, ultrasound has great utility in evaluating fetal heartbeat, gestational age (in a stable patient), and fetal trauma.²¹⁻²³

Following stabilization of the expectant mother, a widely utilized mnemonic for a focused history in pregnant trauma patients is **CODE**:²¹

Complications of pregnancy

Obstetric history and provider

Dating method and estimated due date

Event details

It is important to keep in mind that a digital vaginal examination should be avoided in pregnancies over 20 weeks, as undiagnosed placenta previa can result in massive hemorrhage.²⁴ It is highly recommended that the post-stabilization portion of the patient evaluation be performed in conjunction with an obstetrician.

Complications

Once hemodynamic and patient stability have been addressed, an obstetrician can begin to assess whether the patient has any obstetric complications. A large majority of patients who develop obstetric complications experience uterine contractions, vaginal bleeding, and/or abdominal pain, though some may present with minimal symptoms, if at all.²⁵

Critical management pearls in pregnant patients with blunt trauma:

1. If patient is hemodynamically unstable, resuscitate like any blunt trauma patient and consider emergency c-section if failure to improve.
2. If hemodynamically stable, weigh risks and benefits of advanced imaging.
3. Determine RhD status and manage accordingly.
4. Fetal monitoring for 4 hours minimum if viable pregnancy.

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